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TRANSLATION

MAGNETIC LOGICAL ELEMENTS

By

V. S. Podlipenskiy

FOREIGN TECHNOLOGY DIVISION

AIR FORCE SYSTEMS COMMAND

WRIGHT-PATTERSON AIR FORCE BASE

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UNEDITED ROUGH DRAFT TRANSLATION

MAGNETIC LOGICAL ELEMENTS

BY: V. S. Podlipenskiy

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Magnetic Logical Element

by

V. S. Podlipenskiy

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Known are magnetic logical elements with the aid of which it is possible to carry out operation "I" with negation.

In the proposed magnetic logical element to reduce the equipment and raise the rapid action when carrying out the operation "I" with negation the control winding has two successive inputs.

The principal drawing of the described magnetic logical element is shown in drawing.

The magnetic logical element made over a toroidal core 1 from a material with rectangular hysteresis loop, having two windings: working winding 2(W_p) and controlling 3 (W_y). The polarities of the working (u) and resistance (u') voltages on the drawing for the controlling semiperiod are not circled by rings, and for the working one- they are circled. The same goes for the polarities of the input signals a (input 4) and in (input 5). The working and reference frequencies are sinusoidal, of one frequency and coincide in phase. The input signals appear to be sign changing periodic functions , although the function of the scheme, is principally, not disturbed/even/ when controlling constant signals and signals of mono-and two half period rectifier. The working half period is called the half period, in which diode 6 of

of the working circuit is the conductive, and the controlling, when diode 6 does not conduct. Voltages u_1 and u_6 of signals a and b are connected with each other and with the reference voltage u' by the ratio $U = U_3 / U'$.

In the controlling half period of the condition a = 0, b=0 core 1 does not become demagnetized, because the reference voltage u' is blocked by diode 7. In the working half period of this condition both the reference and working voltages will act in direction of conduction of diodes 6 and 7., whereby the working and controlling circuits will be disconnected upon the adherence of condition

$$(i_y - ip) \angle I_c$$

where i_p and t_p - instantaneous values of currents in windings 2 and 3 in working half period (current i_y - current in the control circuit, reduced to the load circuit).

$I_c = \frac{H_c \cdot e}{w_p}$ - conditional coercitive current

In this way when a = 0 and b = 0 the voltage on the load 8 U_1 = "1" (a/b = 1).

In the controlling half period of the process a= 1 b = 0 there is no demagnetization of the core , because the signal voltage a is compensated by the reference voltage. Consequently, when a = 1 and b = 0 u_n = "1" (a/b=1). The condition a = 0 and b = 1 is no different from the condition a=1 and b=0.

In the controlling semi-period of condition a = 1 and b=1 demagnetization of the core becomes possible , because in direction of diode 7 conductivity acts a demagnetizing voltage.

$$U_a + U_8 - U' \geq U'$$

sufficient at the given amount of turns W_y of control winding 3 for magnetic polarity reversal of the core during the half period from $+\Phi_s$ to $-\Phi_s$.

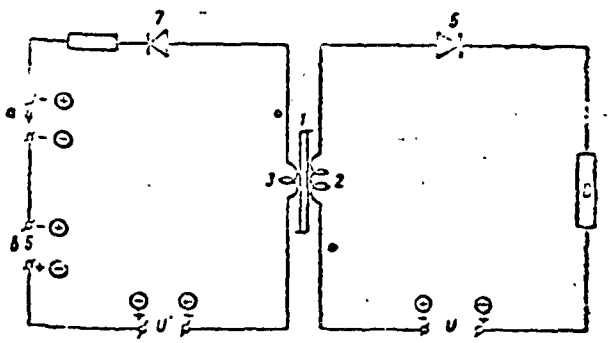
The transformation EMF in the working circuit is blocked by the working voltage U.

In this way, when a = 1 and b = 1 on the load will be a zero output U_z = "0" (a/b = 0(.

The described logical element may find application in automatic devices.

Object of Invention

The magnetic logical element, containing a core with rectangular hysteresis loop, having controlling and functional windings, to each circuit of which are in series connected diode, resistance, and AC voltage source, distinguished by the fact, that for the purpose of reducing the equipment and increasing the rapid action during the execution of operation "I" with negation, the control winding has two sequential inputs.



Drawing

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